

# 物聯網導論

Spring 2025

長庚大學電機系

IoT = Internet of Things



萬物皆聯網

- What is the IoT?
- Examples of IoT?

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You  
IOT



ChatGPT

The Internet of Things (IoT) refers to the network of physical objects or "things" embedded with sensors, software, and other technologies that enable them to connect and exchange data with other devices and systems over the internet. These objects can range from simple household appliances like refrigerators and thermostats to complex industrial machinery and vehicles.

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Key components of an IoT system include:

1. **Sensors and Actuators:** These are the physical devices that collect data from the environment (sensors) and perform actions based on that data (actuators). Sensors can measure parameters like temperature, humidity, motion, light, pressure, etc., while actuators can control things like motors, valves, switches, etc.
2. **Connectivity:** IoT devices need to be connected to the internet to transmit data. This connectivity can be achieved through various means such as Wi-Fi, cellular networks, Bluetooth, Zigbee, LoRaWAN, etc.
3. **Data Processing and Storage:** The data collected by IoT devices needs to be processed, analyzed, and stored. This can be done locally on the device itself or in the cloud.
4. **Networking and Communication Protocols:** Various networking protocols are used to facilitate communication between IoT devices and other systems. These include MQTT, CoAP, HTTP, etc.

## Examples

- Smart home 智慧居家
- Smart city 智慧城市
- Smart grid 智慧電網
- Smart manufacturing 智慧製造
- Smart health 智慧醫療
- Smart lighting 智慧照明
- Driverless car 自駕車
- Unmanned store 無人商店
- ...

- Brief concepts of IoT
- Example: Amazon Go

Computer vision  
Deep learning  
Sensor fusion

電腦視覺  
深度學習  
感測器融合

<https://www.youtube.com/watch?v=EWUA-9QkZxo&t=11s>

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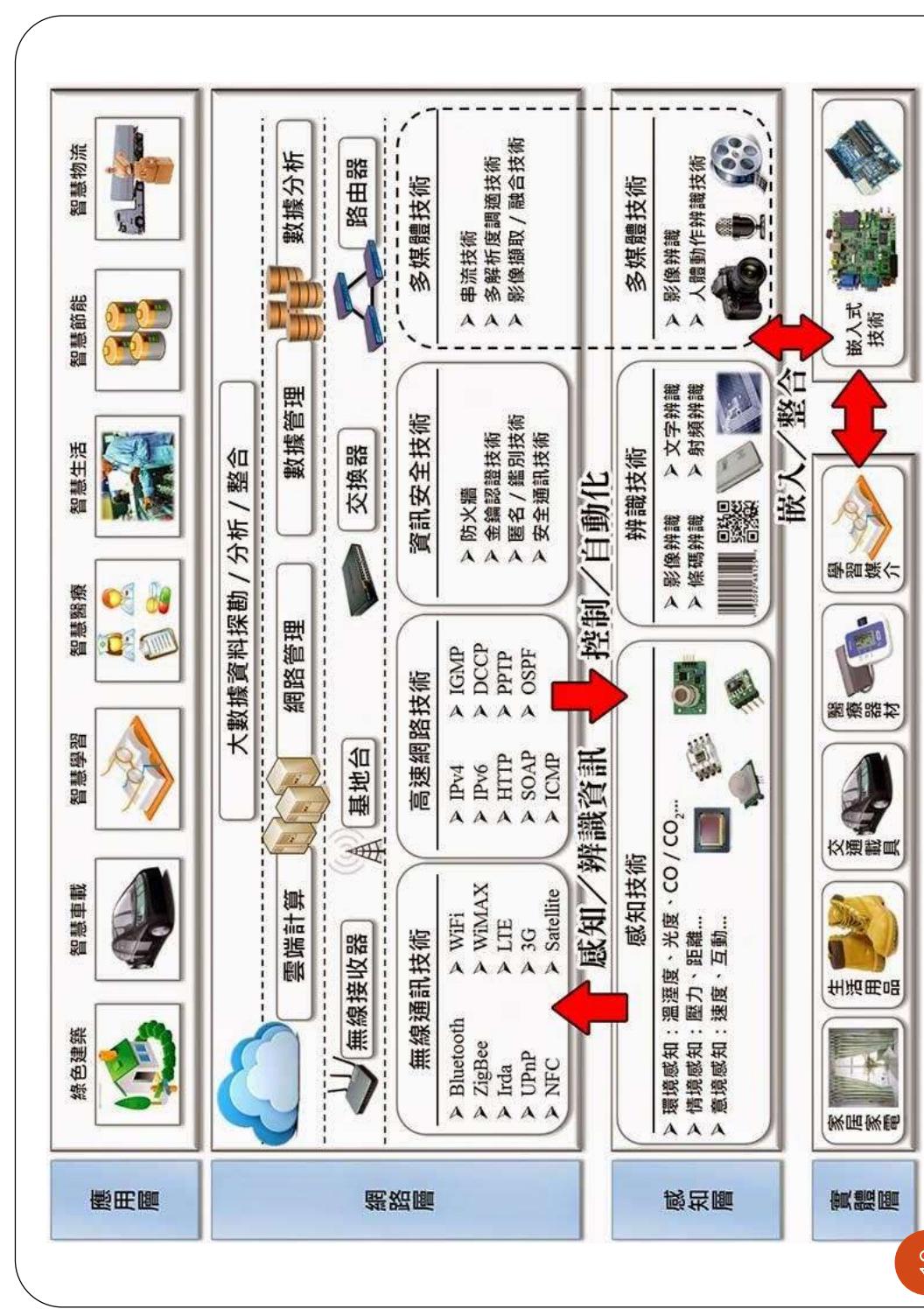
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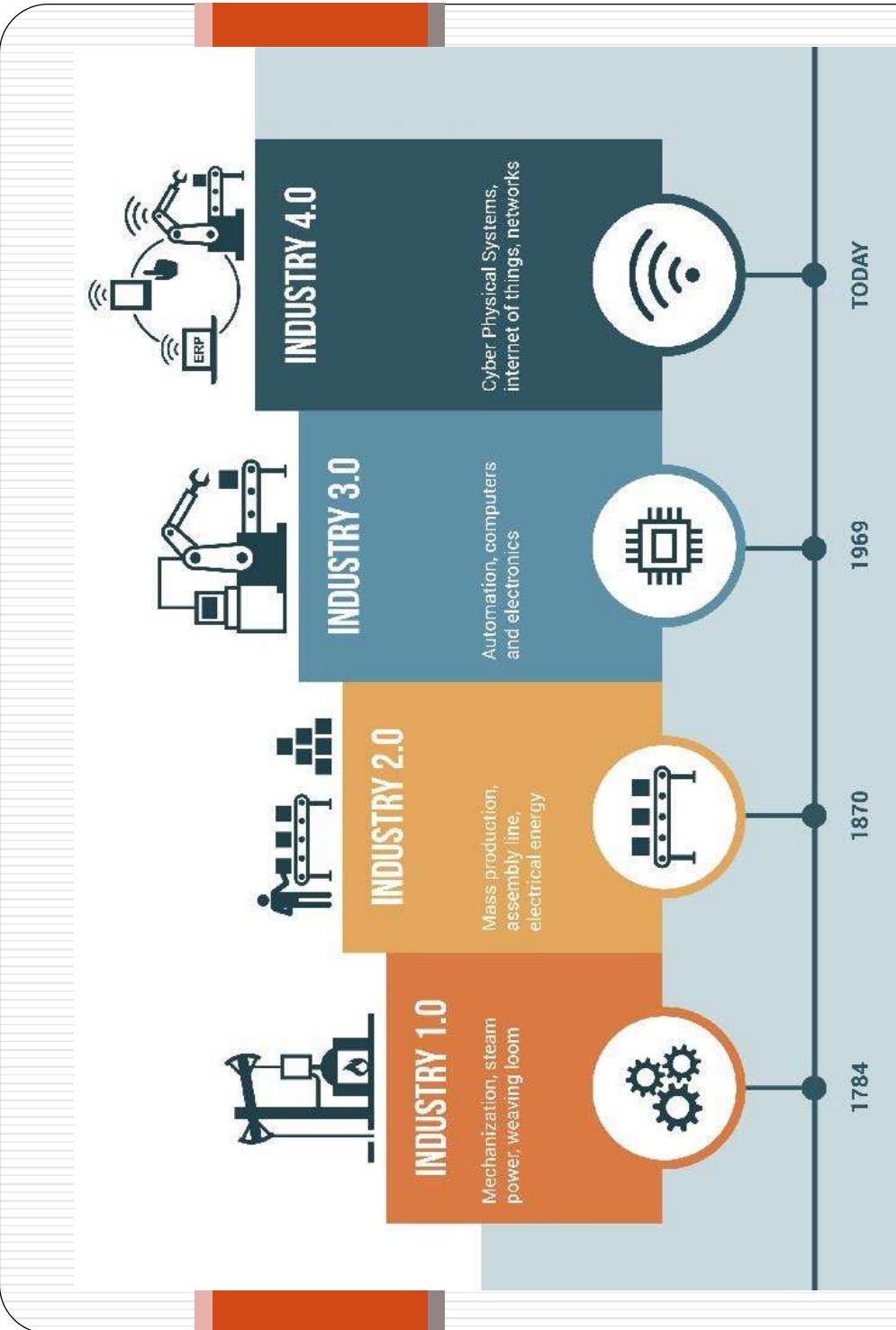
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- Internet of Things (IoT) 物聯網
- Sensor Network 感測網路
- Wireless Communication 無線通訊
- Industry 4.0 工業 4.0
- Cyber Physical System (CPS) 虛實整合系統
- Big Data 大數據
- Cloud Service 雲端服務
- Artificial Intelligence (AI) 人工智能
- Machine Learning 機器學習
- Deep Learning 深度學習
- . . . . .



- Cloud Service 雲端服務
  - Public cloud 公有雲
  - Private cloud 私有雲
  - Hybrid cloud 混和雲
- Data Analysis 數據分析
  - Modeling 建模
  - Prediction 預測
  - Decision 決策
- Database 資料庫
  - SQL

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## 如何改善內湖交通？最強聊天機器人 ChatGPT列5解方 網笑：方案有漏洞

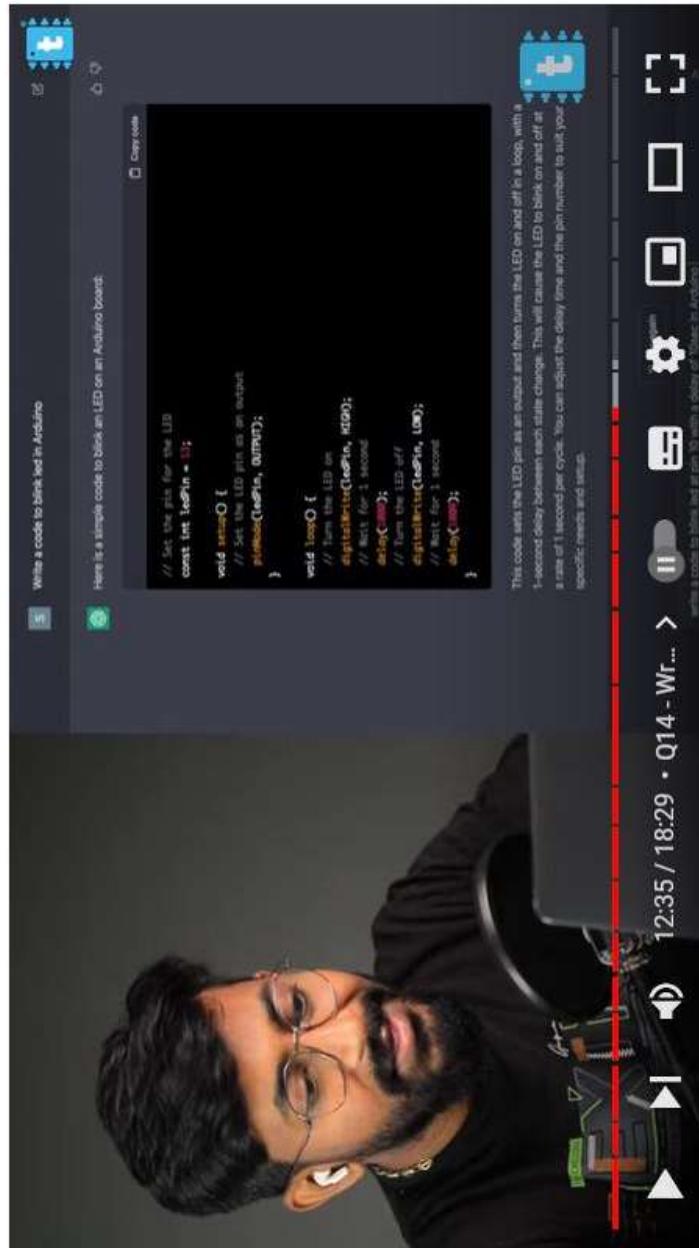
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+ 柯文哲 ▾



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<https://udn.com/news/story/123313/6970456>



ChatGPT Helped me write IOT Project's Code 🔥🔥

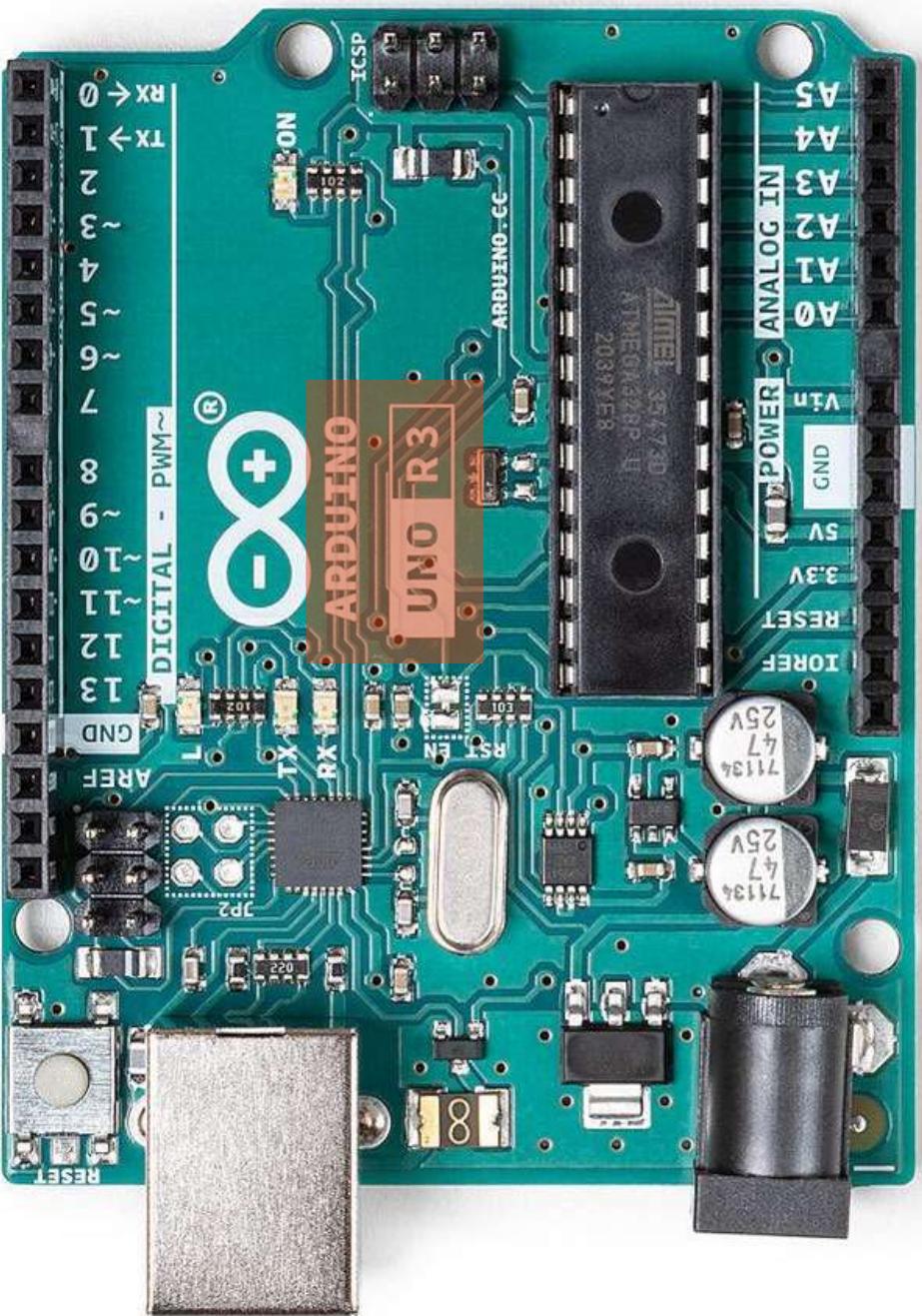
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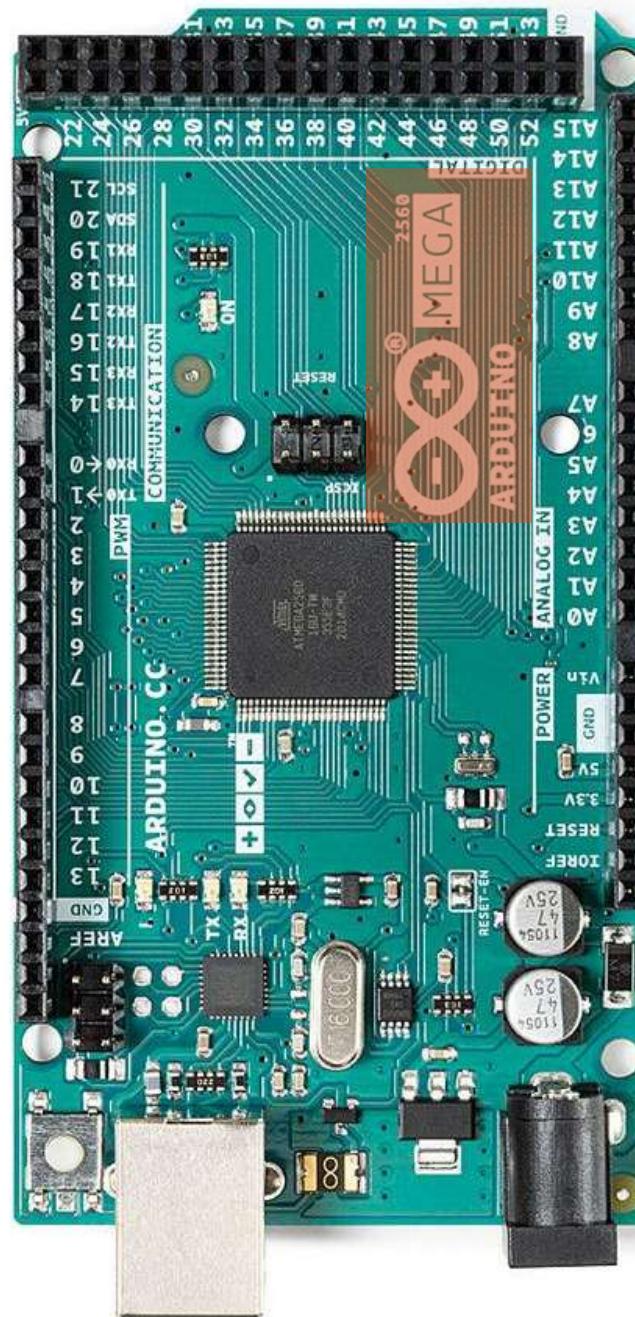
## 課程須知

- 作業、課堂表現 (20%)
  - 實驗 (20%)
  - 測驗 (30%)
- 期末專題 (30%)

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## ChatGPT

Arduino is an open-source electronics platform based on easy-to-use hardware and software. It consists of both physical programmable circuit boards (microcontrollers) and a software development environment for writing and uploading code to the board. Arduino boards are able to read inputs from various sensors, control lights, motors, and other actuators, and interact with other devices via communication protocols like Serial, I2C, and SPI.

1. Arduino Boards: These are the physical hardware components of the Arduino platform. They typically consist of a microcontroller (such as an ATmega series chip) and various input/output pins for connecting sensors, actuators, and other devices. Examples of Arduino boards include the Arduino Uno, Arduino Nano, Arduino Mega, etc.
2. Arduino IDE (Integrated Development Environment): This is the software development environment used to write, compile, and upload code to Arduino boards. It provides a simple and easy-to-use interface for writing code in the Arduino programming language, which is based on C/C++. The IDE also includes a library of pre-written code examples and functions to help users get started with their projects.
3. Arduino Programming Language: Arduino code is typically written in a simplified version of C/C++ that includes pre-defined functions and libraries for interacting with hardware components. Users can

## #include <DHT.h>

```
#define DHTPIN 2 // Pin where the
DHT sensor is connected
#define DHTTYPE DHT22 // DHT 22
(AM2302)
#define RELAYPIN 3 // Pin where the
relay is connected
#define TEMP_THRESHOLD 25 // Temperature threshold in Celsius
DHT dht(DHTPIN, DHTTYPE); // Initialize
DHT sensor

void setup() {
  Serial.begin(9600);
  dht.begin();
  pinMode(RELAYPIN, OUTPUT); // Set
  relay pin as output
}
```

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## Arduino溫度控制範例

```
void loop() {
  // Read temperature as Celsius
  float temperature = dht.readTemperature();

  // Check if the sensor is working correctly
  if (isnan(temperature)) {
    Serial.println("Failed to read from DHT
sensor!");
    return;
  }

  // Display temperature on the serial monitor
  Serial.print("Temperature: ");
  Serial.print(temperature);
  Serial.println(" °C");
}
```

```
// Control the relay based on the
temperature
if (temperature > TEMP_THRESHOLD) {
  digitalWrite(RELAYPIN, HIGH); // Turn
  on the fan (or heater)
  Serial.println("Fan ON");
} else {
  digitalWrite(RELAYPIN, LOW); // Turn
  off the fan (or heater)
  Serial.println("Fan OFF");
}

delay(2000); // Wait for 2 seconds before
reading the temperature again
}
```

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How Arduino is open-sourcing imagination | Massimo Banzi

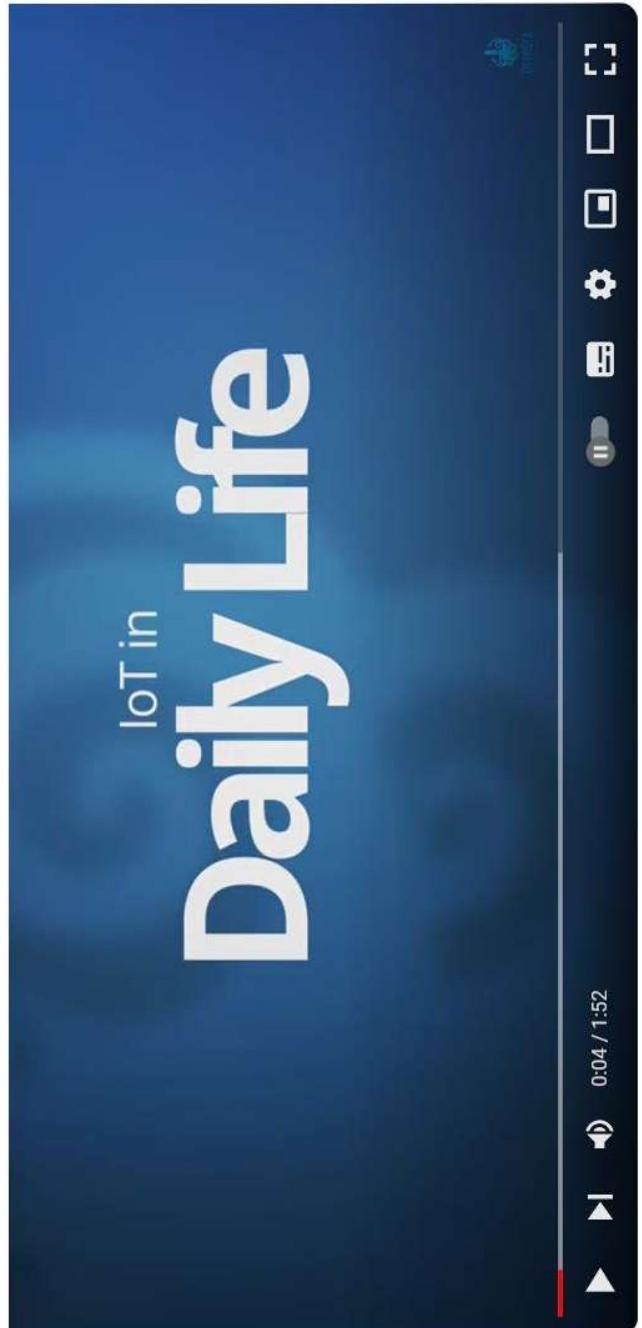
<https://www.youtube.com/watch?v=UoBUXOOdLXY>

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<https://www.youtube.com/watch?v=vSzSuGIPkii>

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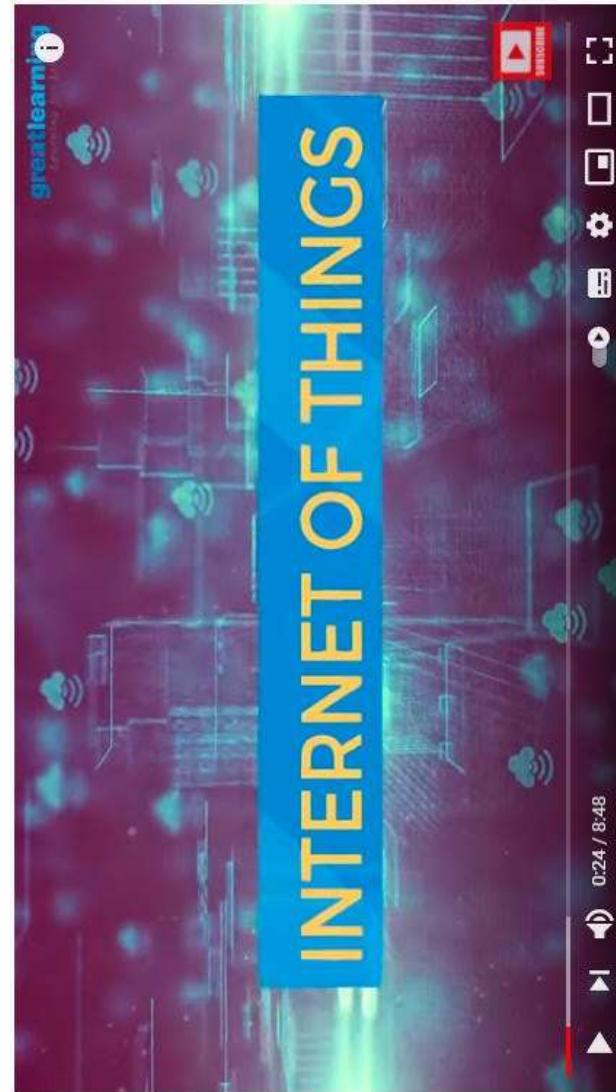


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[https://www.youtube.com/watch?v=cqjZms\\_7R\\_0](https://www.youtube.com/watch?v=cqjZms_7R_0)

## Homework

- 觀看以下影片
- 200~250字內容摘要及心得



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<https://www.youtube.com/watch?v=Fj02iTTrWUx0>

# ?

## 空氣品質物聯網

<https://www.youtube.com/watch?v=WvO9gYsve0w&t=86s>